

# *The AMC RDEC Federation*

## *Supporting Future Combat Systems and Beyond*



*Don Gulliksen*  
*(973) 724-9000*

*20 June 2001*  
*Armaments For The Army Transformation*



# *The Army's SMART Initiative:* *Simulation & Modeling for Acquisition, Requirements & Training*



## SBA Vision

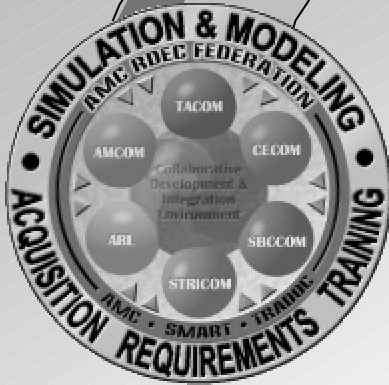
"an acquisition process in which DoD and Industry are enabled by robust, collaborative use of simulation technology that is integrated across acquisition phases and programs."



The Army's vision for SMART is a process by which we capitalize on Modeling and Simulation (M&S) technology to address the issue of system development and life-cycle costs through the combined efforts of the requirements, training, and acquisition communities.



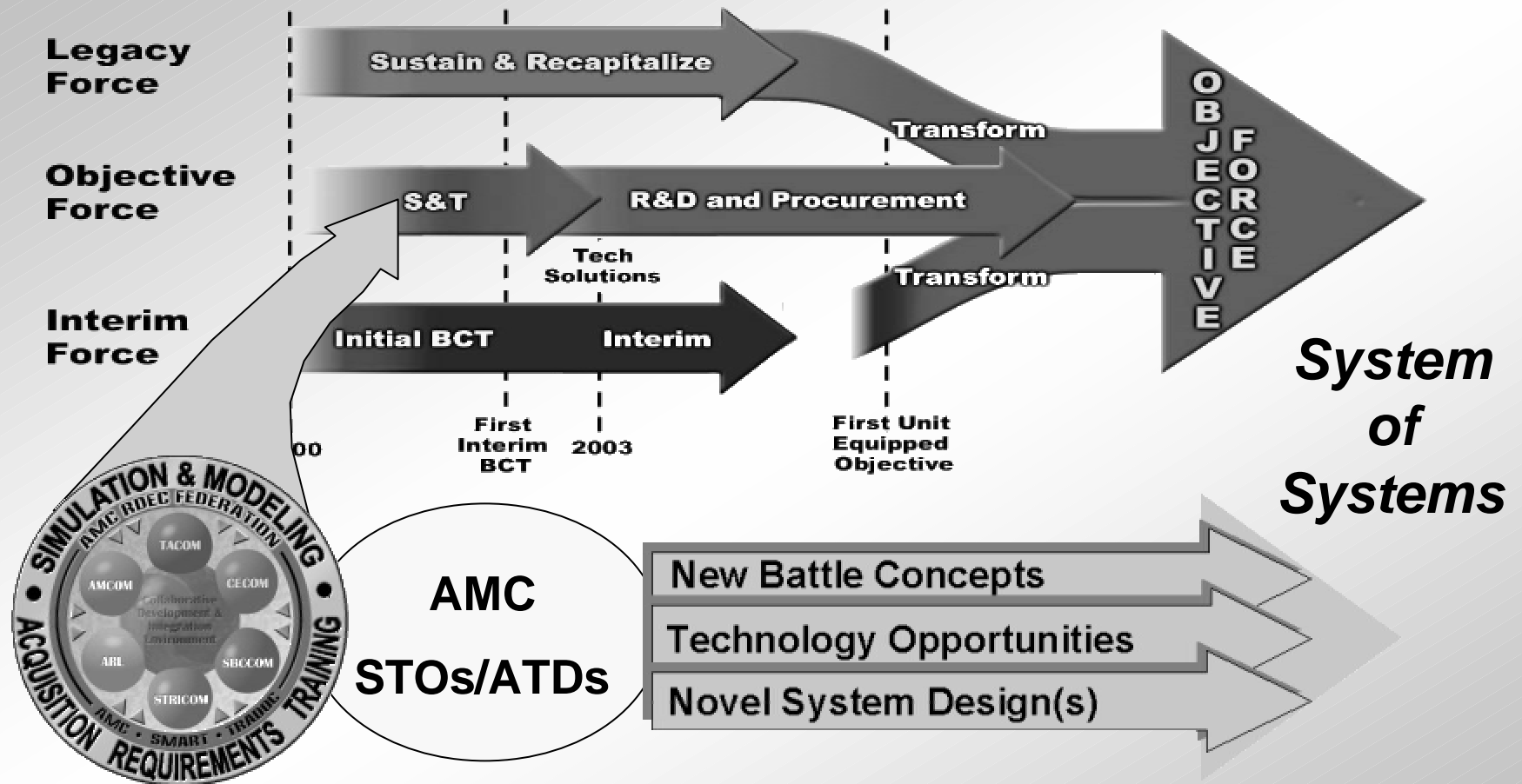
# AMC RDEC Federation Vision



- *To develop an AMC-wide distributed modeling and simulation environment that will permit the overall research, development and acquisition community to have wide access, linkage, and integrated use of a diverse set of models and simulators available at each of the federation partner laboratories/facilities.*
- *To provide a capability for representing and evaluating, through distributed modeling and simulation, a wide range of technologies, military systems, mission equipment, and battle space capabilities.*
- *To provide a capability for addressing issues from both an individual platform and system-of-systems perspective for the optimal development, integration, and evolution of information, communication, mission equipment, weapon systems, and platform technologies.*



# The Army Transformation

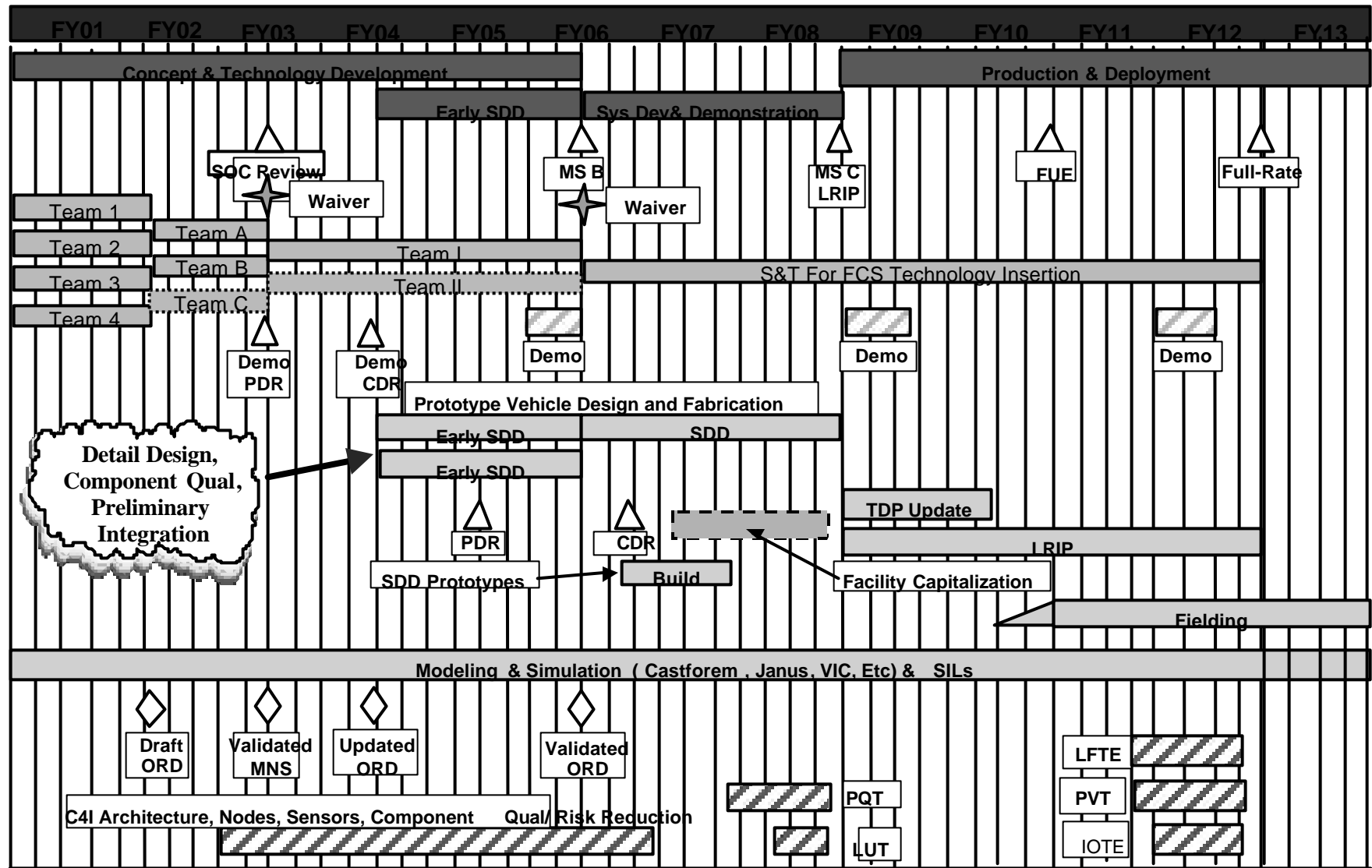


... The Army is transforming itself and M&S will play an important role



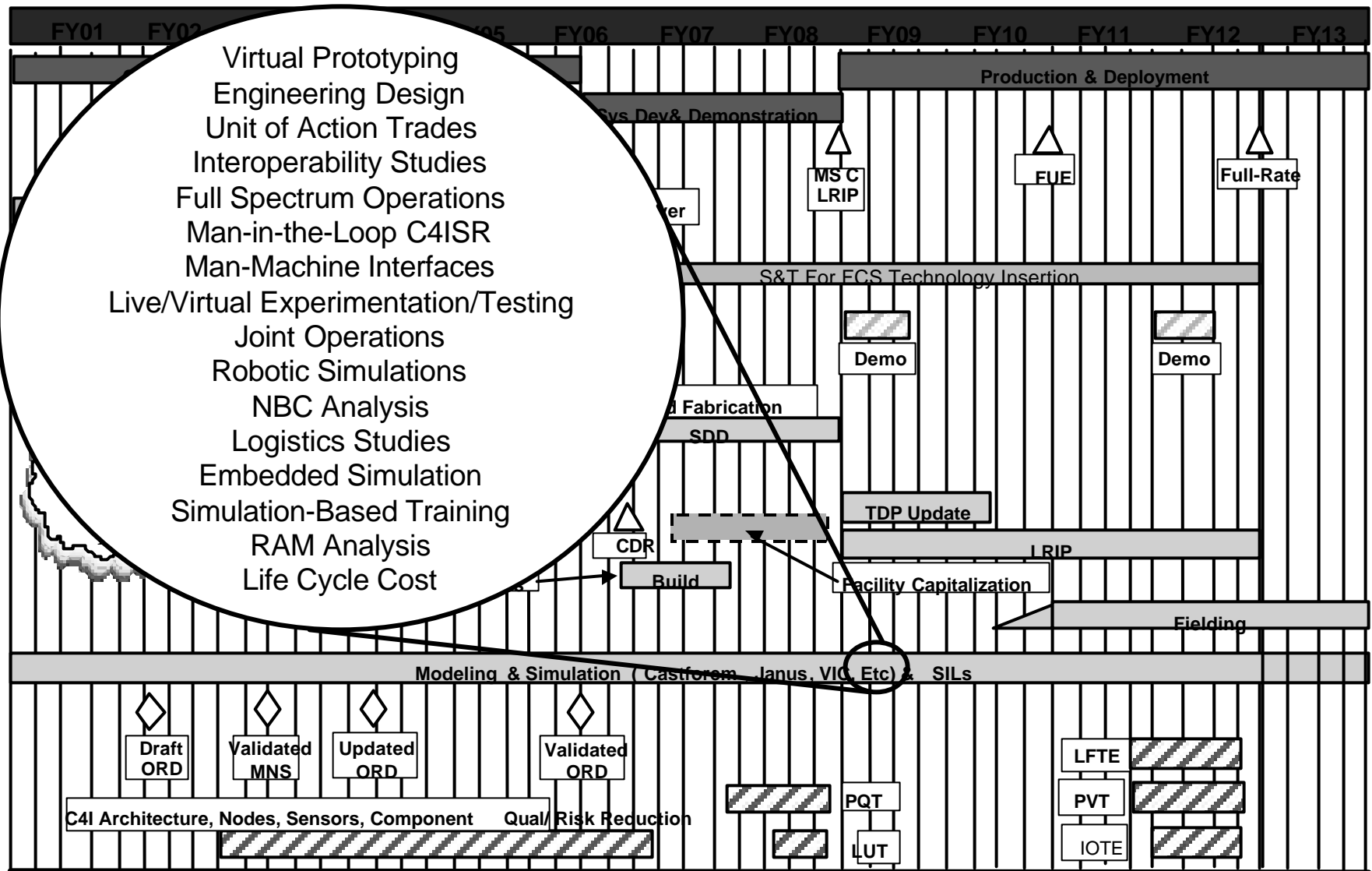


# Current Draft FCS Schedule



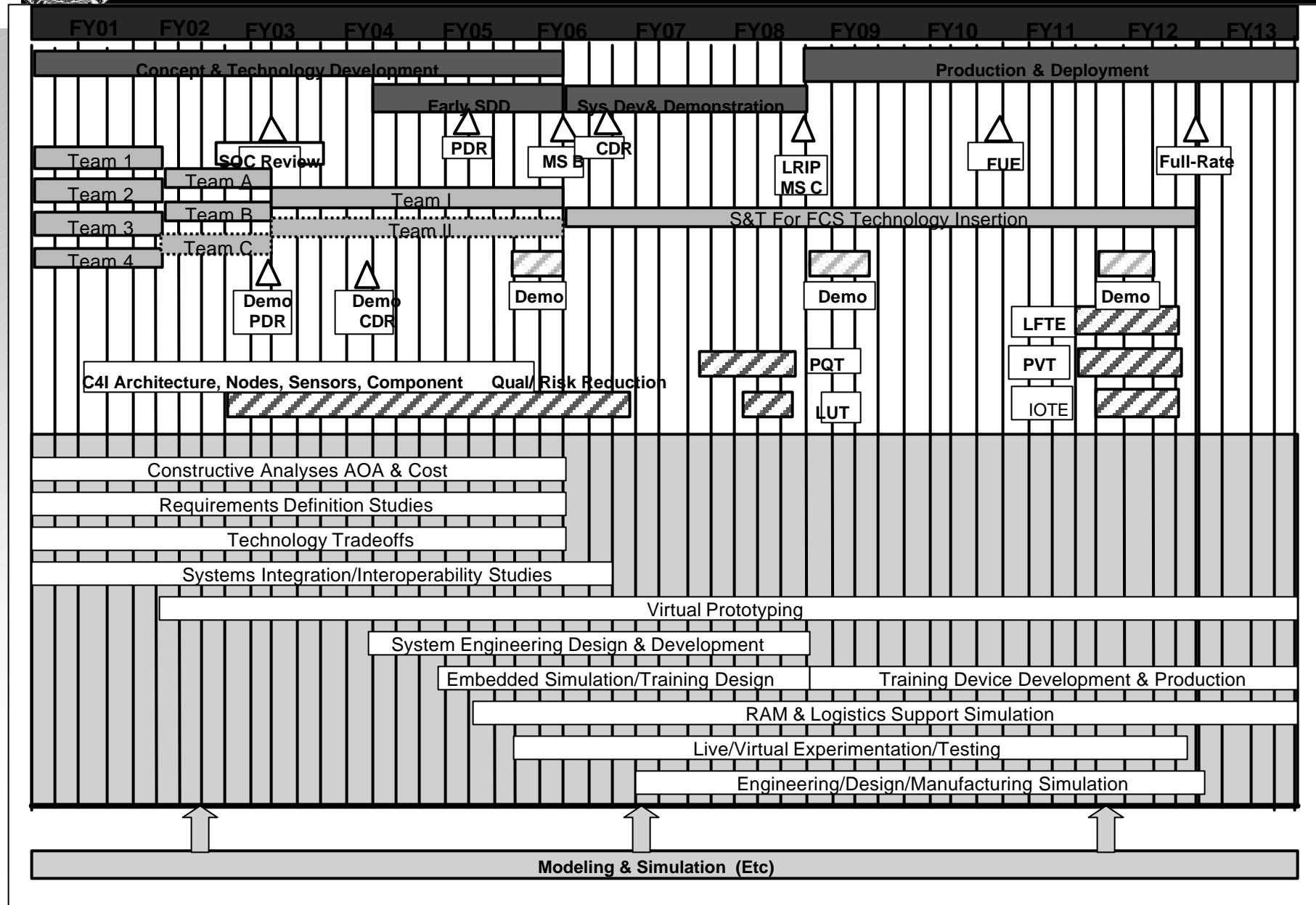


# Breaking Apart the Long Green Line



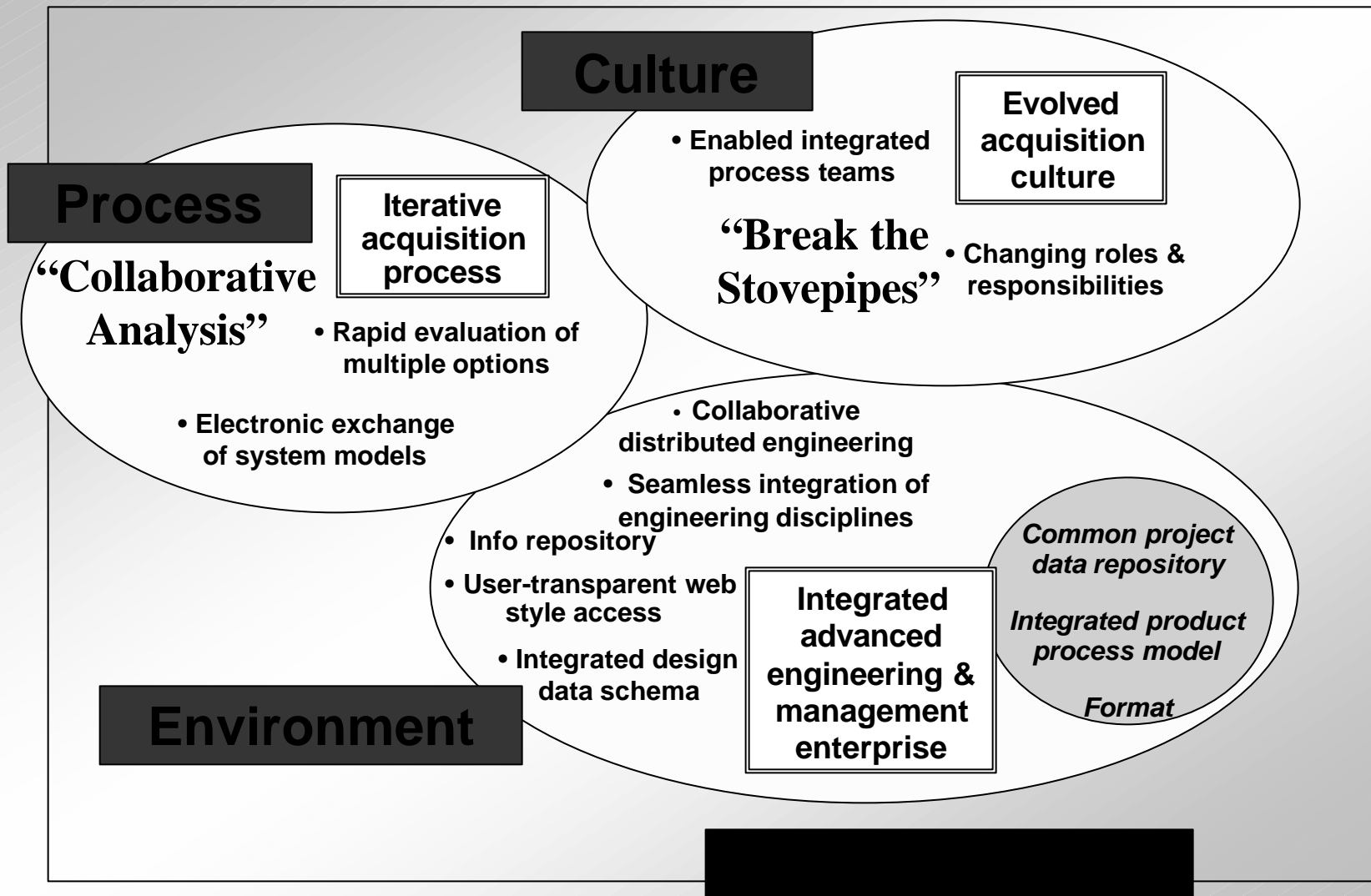


# M&S Life Cycle Support Plan





# *SBA & SMART are much more than just technology*





## *What is a Federation? – the new culture...*

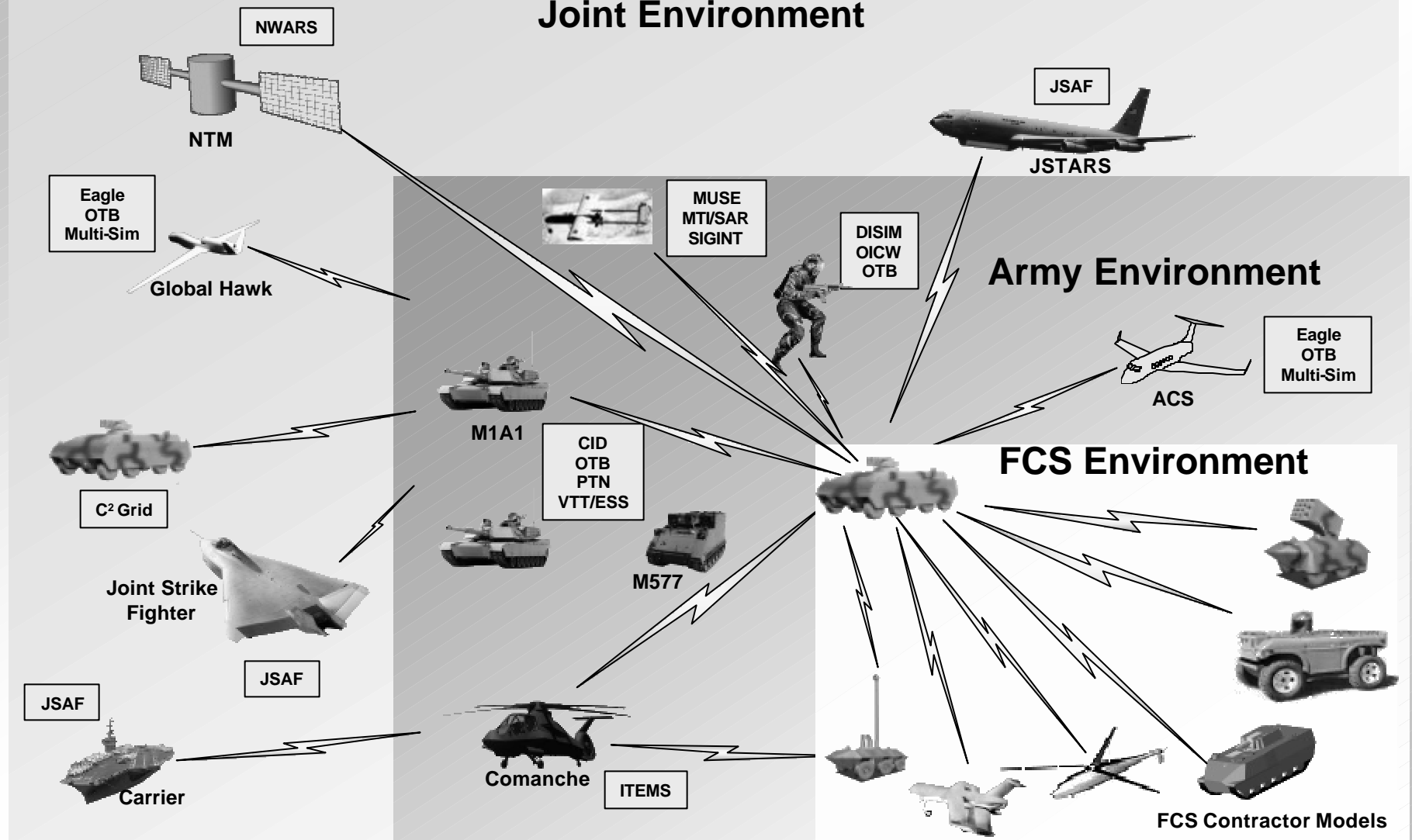
People working together toward a common objective...





# *Common Objective: simulate & experiment as we fight*

## Joint Environment





# AMC RDEC Federation core competencies

## Organizations

## M&S used

## Functions



AMRDEC



SBCCOM



ARDEC



CECOM/  
NVESD



Army Research  
Laboratory



STRICOM



TARDEC



CERDEC/  
Monmouth



COE ERDC

IDEAS

NGPM

Vulnerability Server

MP-ERM

DIFM

CBPOP

DI-Sim

APS Server

Missile Server

HLASIM

STRIVE/ITEMS

ATCOM

Urban Sprawl Server

FlightLab

TIM/IUGS/SAR/ISAT

NRMM

OneSAF TestBed

JSAF/ModSAF/DISAF

Hi-Res Terrain

Paint the Night/NVTHERM

C4I Stimulation Tools

Reconfigurable Simulators

Data Analysis Tools

FIRESIM

Stealth

HLA

Engineering Performance

Component Models

6-DOF and Flight Models

Interior Geometry

Urban

Robotics

Human Factors

Sensors/Targeting/Timelines

Munitions/Lethality/Survivability

Brigade & Below SA/C4ISR &  
EAB/Joint Connectivity

Force-on-Force

Soldier-in-the-Loop

Logistics

Sustainment/Deployability

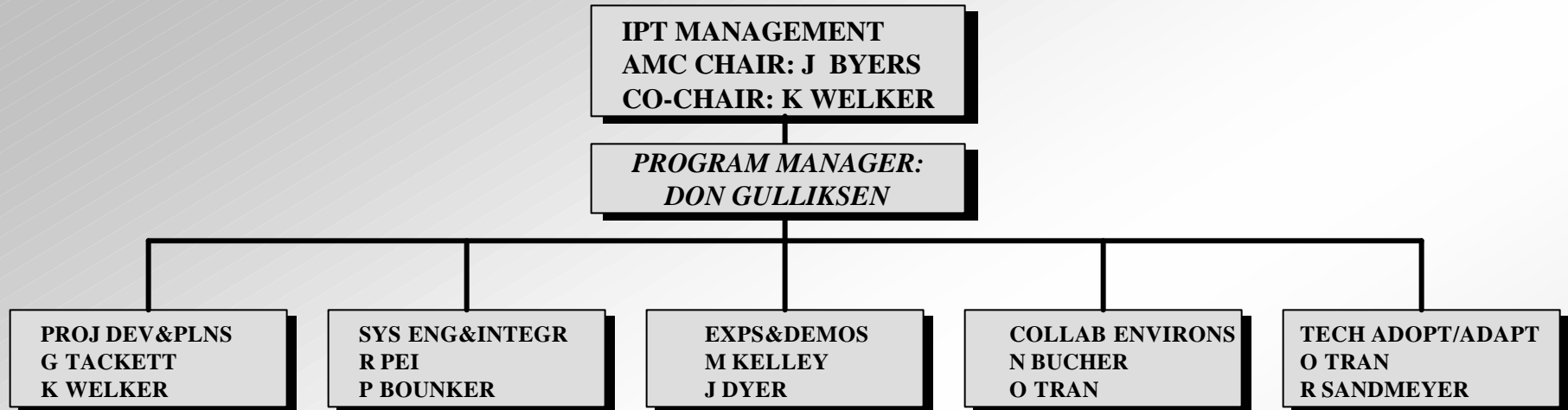
Weather/Obscurants

Mobility

Dismounted Soldiers



# AMC RDEC Federation operational assignments



- Looks like an org chart*
- Smells like an org chart*
- Isn't an org chart*
- It's a new culture...*

## Army Materiel Command Headquarters:

Mr. Ken Welker (kwelker@hqamc.army.mil)  
Mr. Jack Byers (jbyers@hqamc.army.mil)

## Aviation & Missile Command

Dr. Nancy M. Bucher (nbucher@mail.arc.nasa.gov)  
Mr. Greg Tackett (gtackett@redstone.army.mil)

## Communications and Electronics Command

Mr. Richard Pei (peir@mail1.monmouth.army.mil)  
Mr. Mike Kelley (mkelley@nvl.army.mil)

## Tank, automotive, and Armaments Command

Mr. Don Gulliksen (gulliksen@pica.army.mil)  
Mr. Jeff Dyer (jdyer@pica.army.mil)  
Mr. Paul Bounker (bounkep@tacom.army.mil)

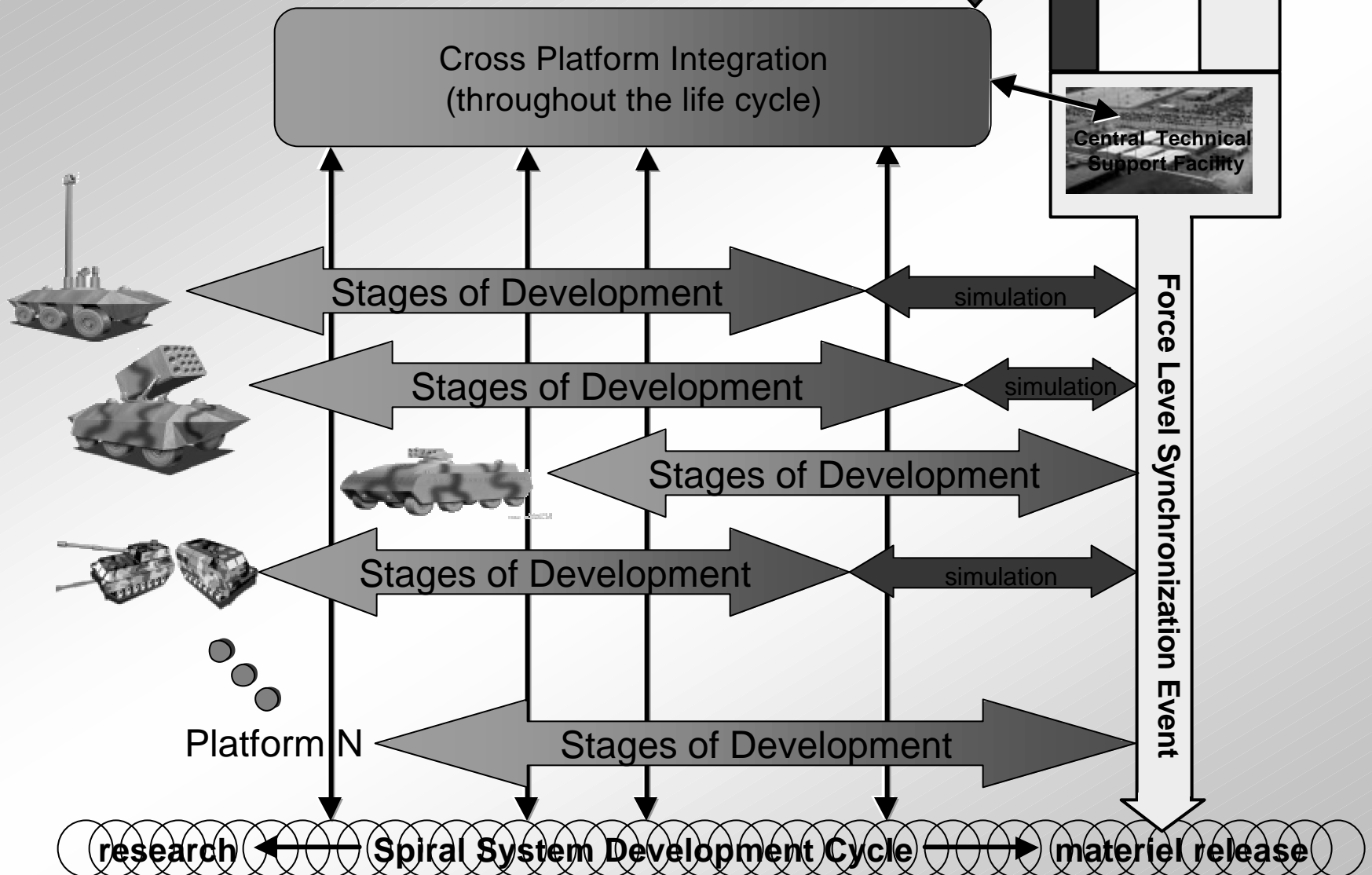
## Simulation, Training, and Instrumentation Command

Ms. Oanh Tran (Hoang-Oanh\_Tran@stricom.army.mil)





# *How does the process change?*





## *What are the characteristics of the environment?*

- A digital environment for developers and users which is:
  - virtual
  - low cost and reusable
  - participative and distributed
  - available throughout the life cycle
- A standard architecture which permits:
  - combinations of models, simulators and platforms
  - distributed plug and play connections
  - backward compatibility
- A common synthetic environment providing:
  - consistent terrain
  - joint exercises across organizations/Services





## *The Key: Create the Sandbox*

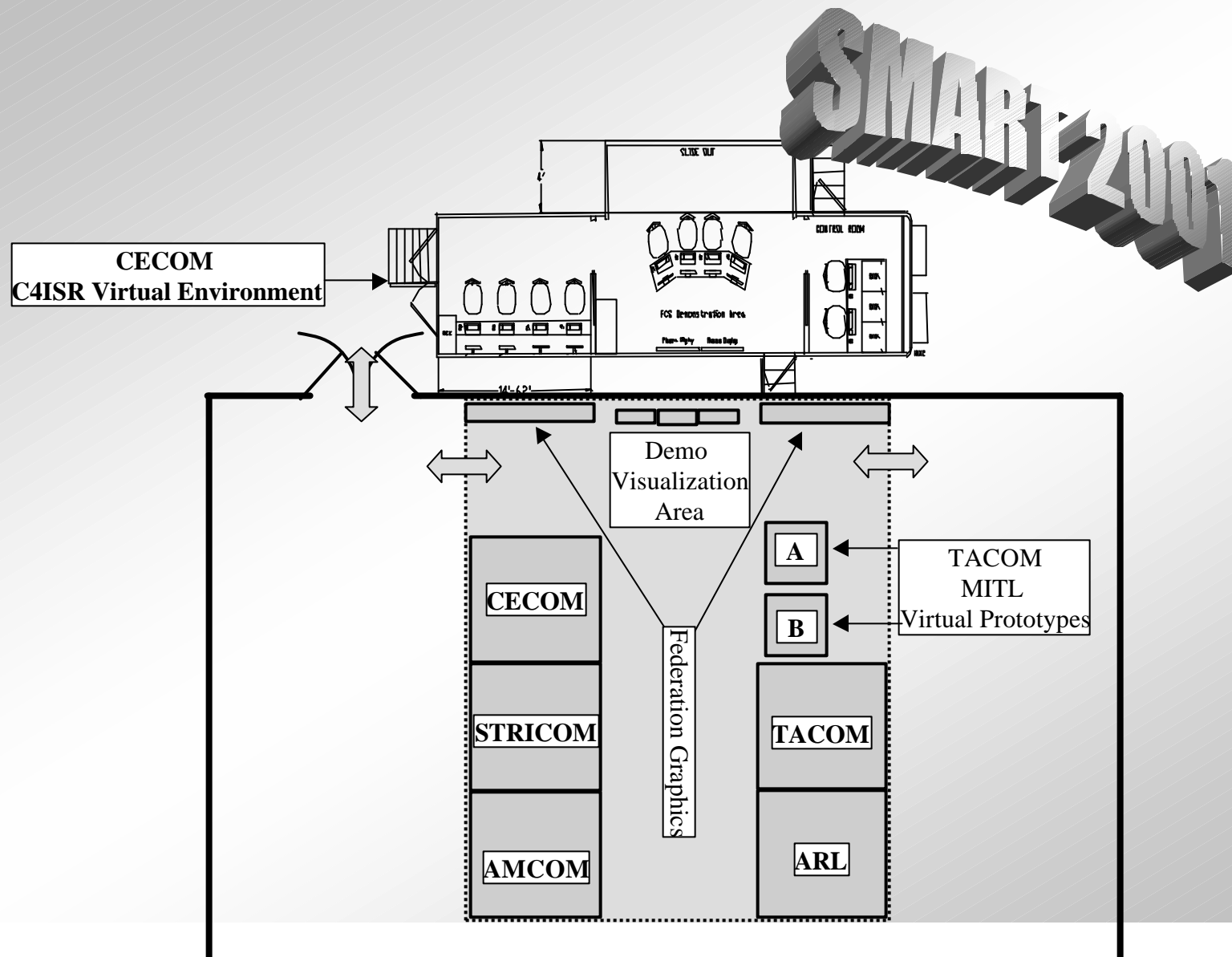
- Create a distributed, collaborative, *persistent* engineering *environment*:
  - A “common sandbox”
  - Everyone gets to play
  - Rules are set by Mother
- Serves cross-cutting needs:
  - Materiel development community
    - Labs/Arsenals
    - Contractors
  - Combat development community
    - Branch schools, CAC, etc.
    - CONOPS & TTP development
  - Joint community access

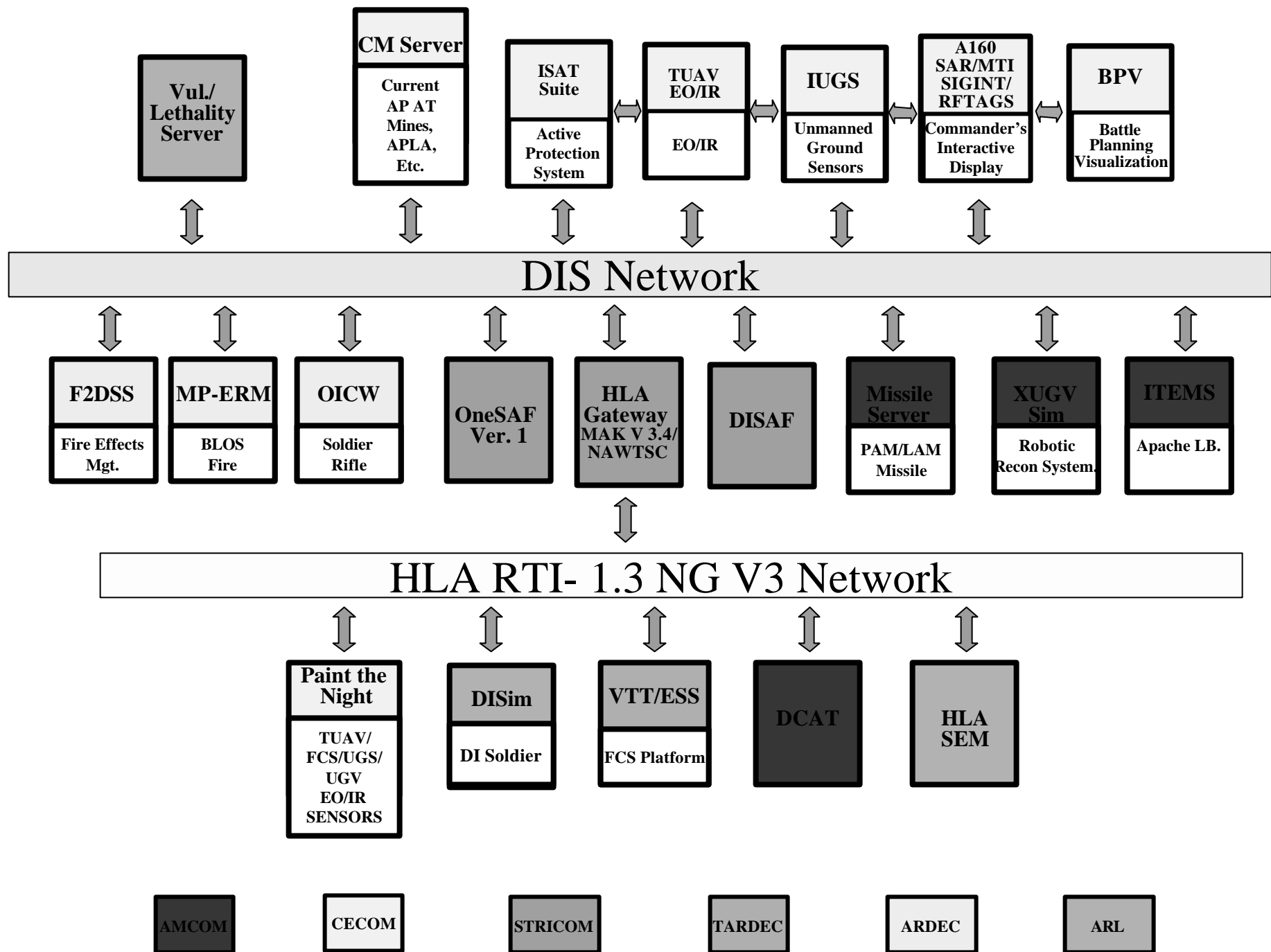


*<sandbox – version 1.0>*

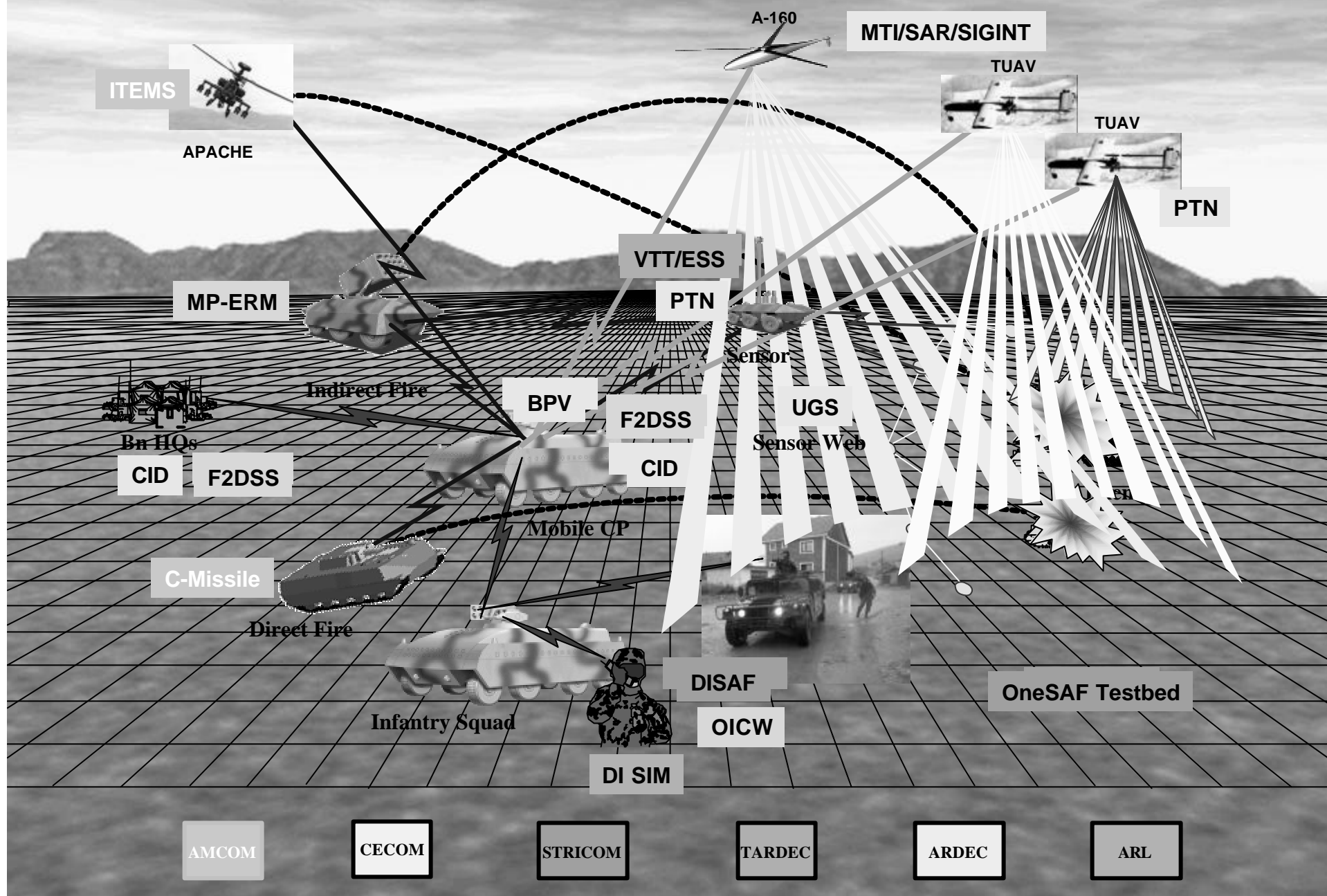


# AMC RDEC Federation: First Experiment





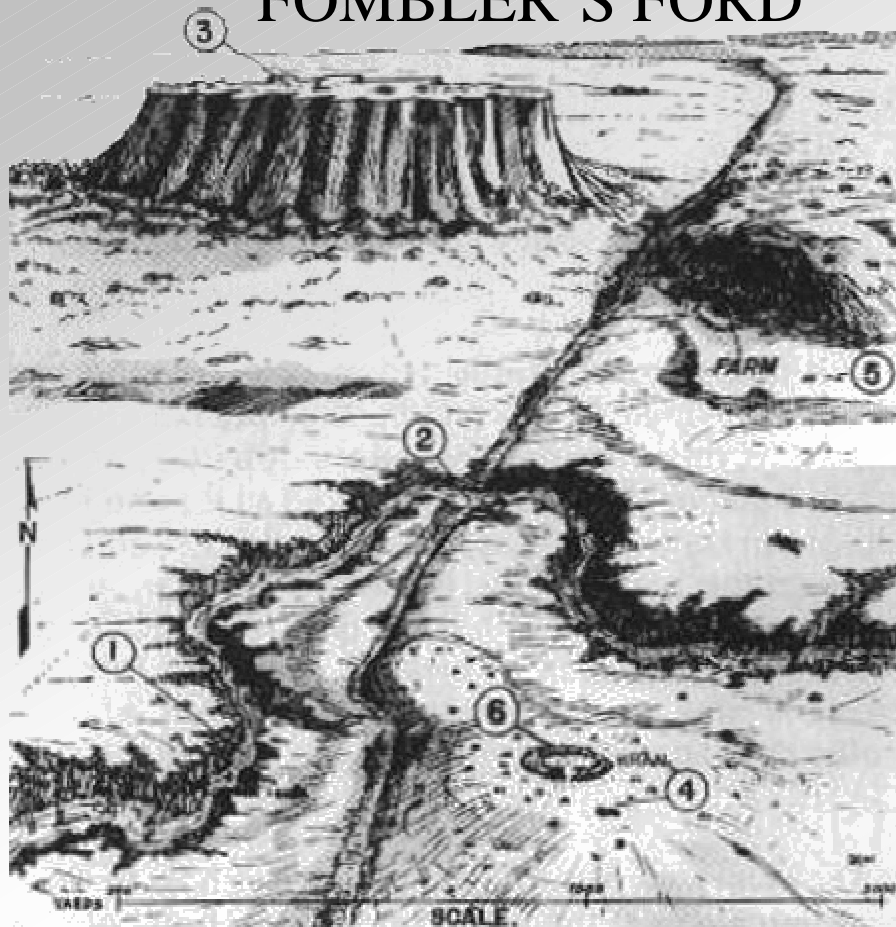
# *AMC RDEC Federation - An FCS Integration Environment*





## FOMBLER'S FORD

### FOMBLER'S FORD

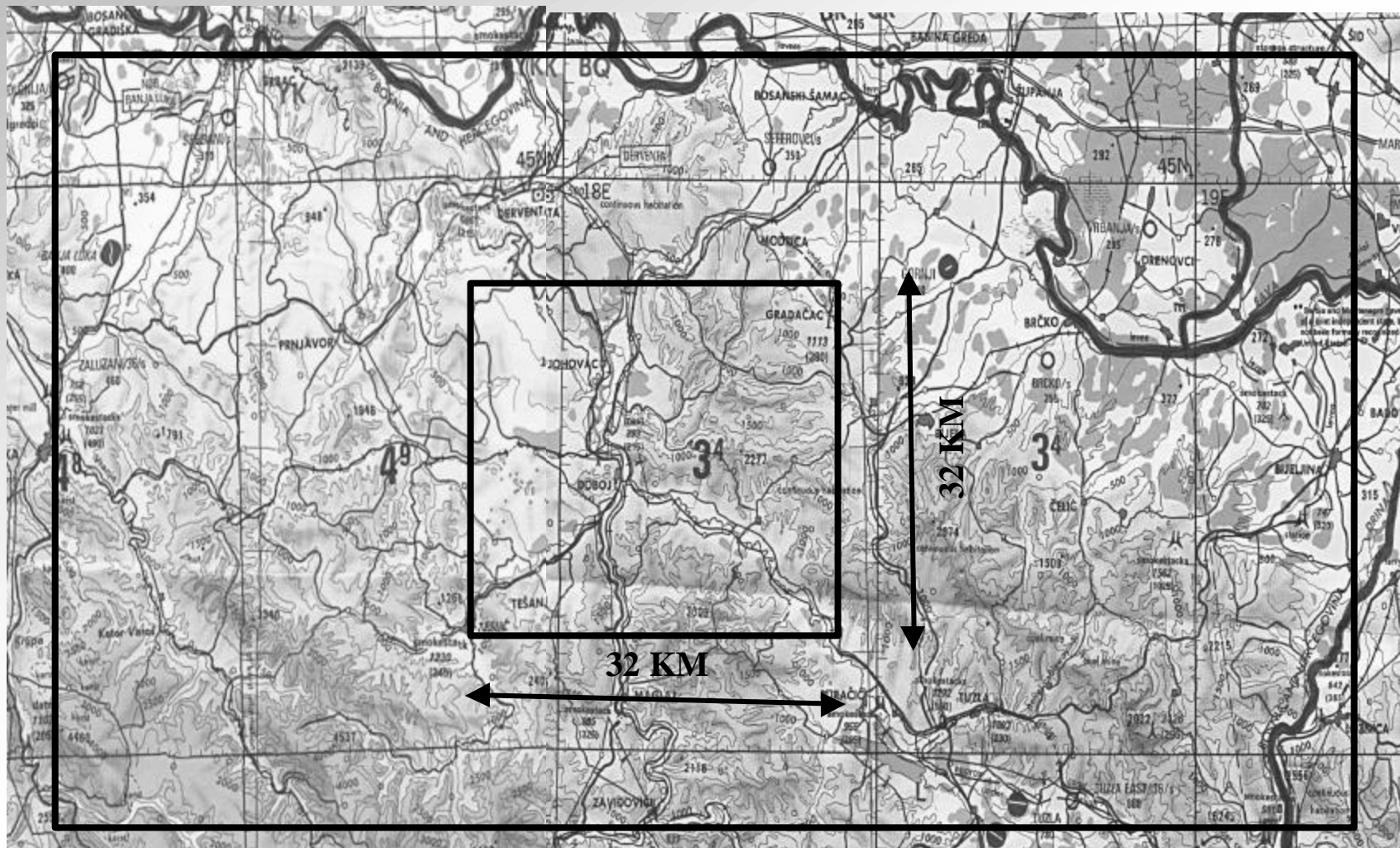


- Ogenchornya River
- Ford
- Nichevo Mountain
- Dobroy Hill
- Starry Hill
- Dobroy Village

*Fomblers Ford depicts four dreams in which a platoon of the Combined Arms Battle Team protects the Ford in a defensive position. While in the defense, the platoon incurs four dreams with which it engages the enemy. The first dream presents six Panslav IV as the advance guard of an enemy tank battalion approaching the Ford. The second dream describes three enemy ATGMs on a hillside above a suspected enemy strong point. The third dream depicts two Enemy assault squads approaching the CP from the south via the Ogenchornya River. The fourth dream describes a multiple event in which four enemy helos approach the Ford while three flat bed trucks loaded with refugees and six possible guerillas approach a road block near Dobroy Hill.*



## *Northeast Bosnia Terrain*







# *1<sup>st</sup> Dream – anti-armor engagement*

Four pairs of radar-equipped robotic rotorcraft equipped with (MTI) radars take station High above the battalion's zone before troops arrive in the theater.

Possible enemy targets are detected moving south. The targets are automatically classified as Panslav IV tanks by acoustic and seismic ground sensors deployed by the battalion.

Cdr receives radio voice transmission stating that the Panslavs had been identified as the advance guard of an enemy tank battalion, the main body of which was moving south some 35 km distant.

1

Cdr attaches two RBs, mounted on unmanned trucks to a CV with a lean-to. Once in position Cdr launches a salvo of ten – loitering missiles – to a point overhead the Panslavs ready to plunge downward at his command. One master missile carries sensors for BDA.

2

Battalion commander times the platoons attack on the Panslavs to coincide with a deep attack by Divarty and Apache Longbows on the enemy battalions main body.

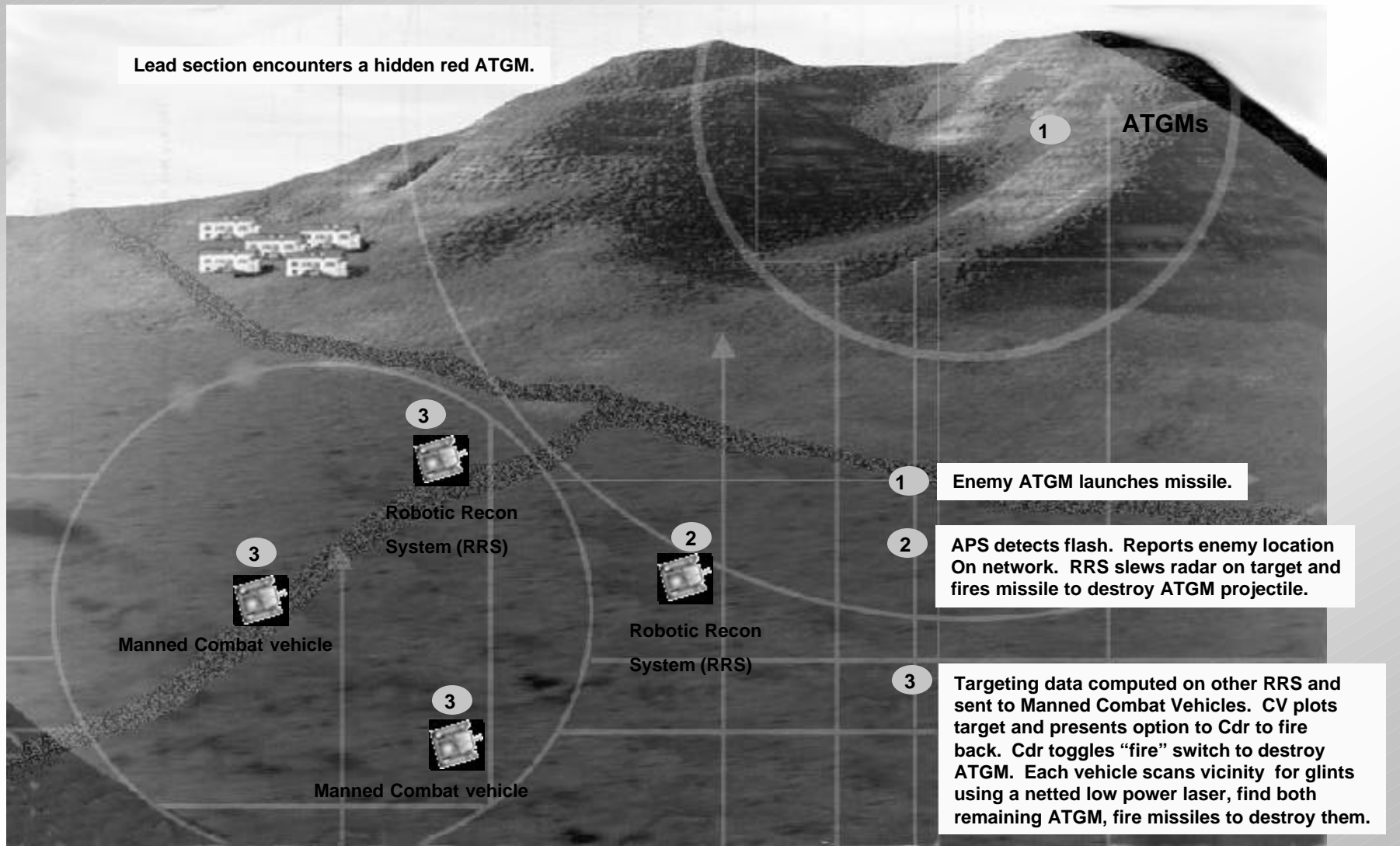
1

2





## 2<sup>nd</sup> Dream – recon patrol encounters ATGMs





## 3<sup>rd</sup> Dream – night perimeter infiltration

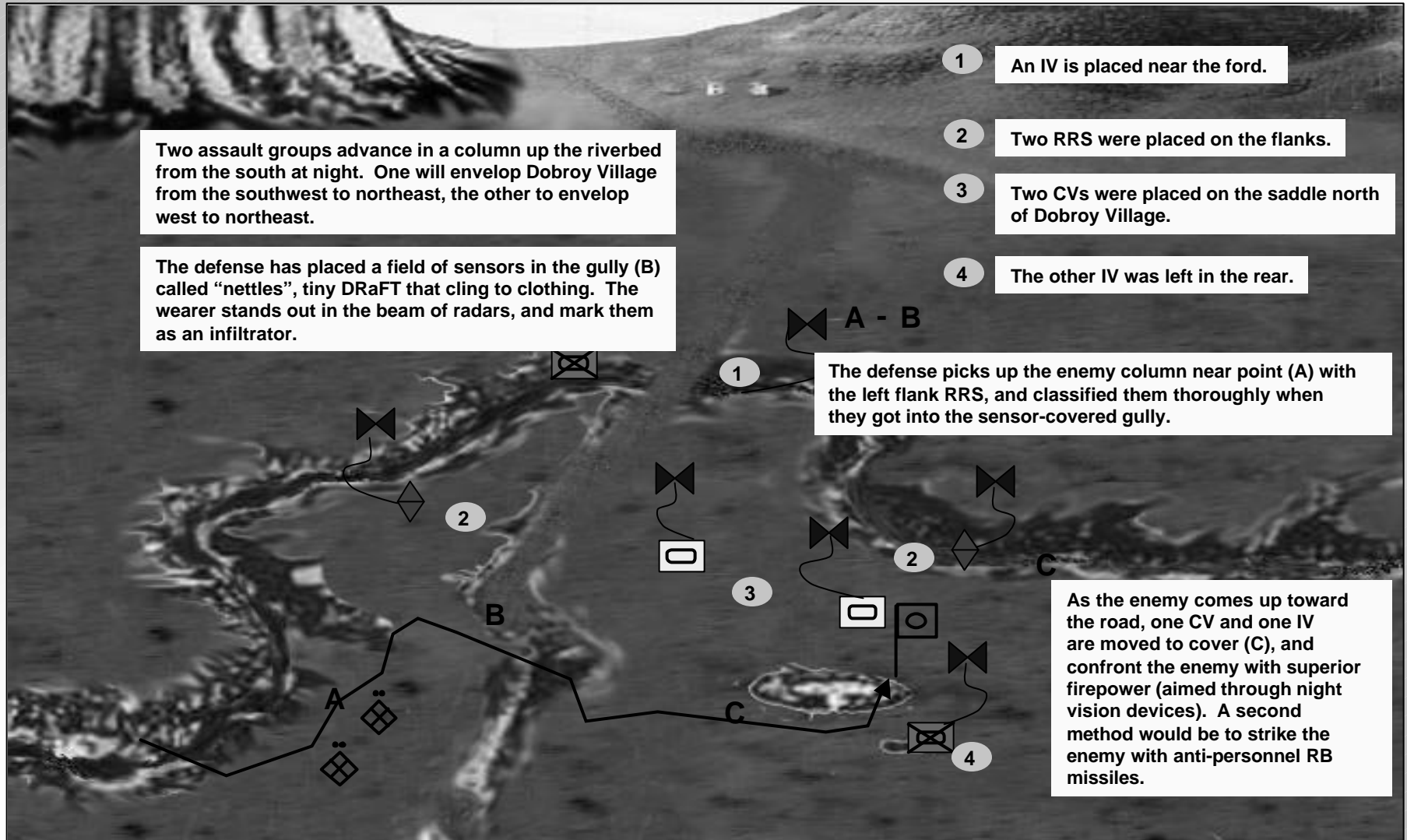
Two assault groups advance in a column up the riverbed from the south at night. One will envelop Dobroy Village from the southwest to northeast, the other to envelop west to northeast.

The defense has placed a field of sensors in the gully (B) called “nettles”, tiny DRaFT that cling to clothing. The wearer stands out in the beam of radars, and mark them as an infiltrator.

- 1 An IV is placed near the ford.
- 2 Two RRS were placed on the flanks.
- 3 Two CVs were placed on the saddle north of Dobroy Village.
- 4 The other IV was left in the rear.

The defense picks up the enemy column near point (A) with the left flank RRS, and classified them thoroughly when they got into the sensor-covered gully.

As the enemy comes up toward the road, one CV and one IV are moved to cover (C), and confront the enemy with superior firepower (aimed through night vision devices). A second method would be to strike the enemy with anti-personnel RB missiles.





## *Lesson: This isn't a static environment...*



- M&S framework must live, evolve & persist with the system
  - Constructive migrates to virtual
    - Sensors may remain constructive until built/tested
  - Mockups/virtual migrates to demonstrator
    - Brassboard to hardware
    - Combo of live/virtual/constructive
  - Training system is planned outgrowth of virtual
    - Live/virtual testing yields training approaches



# *Lesson: Nobody wants to buy the infrastructure*





## The Goal: A Virtual Army Research, Development and Engineering Community

[<http://www.sandbox.army.mil>](http://www.sandbox.army.mil)

Edit

Topology

Assets

Logistics

▼

Roads

Buildings

▼

Floors

Material

▼

Blue Assets

Vehicles

Armaments

Missiles

Aircraft

Communications

Command&Control

Intelligence

Soldiers

▼

Press to select satellite imagery

Mortars

Artillery

Mines

▼

Self Propelled

Towed

Robotic

▼

Red Assets

Vehicles

Armaments

Missiles

Aircraft

Communications

Command&Control

Intelligence

Soldiers

▼

Open Scenario Archives

Scenario Action Control

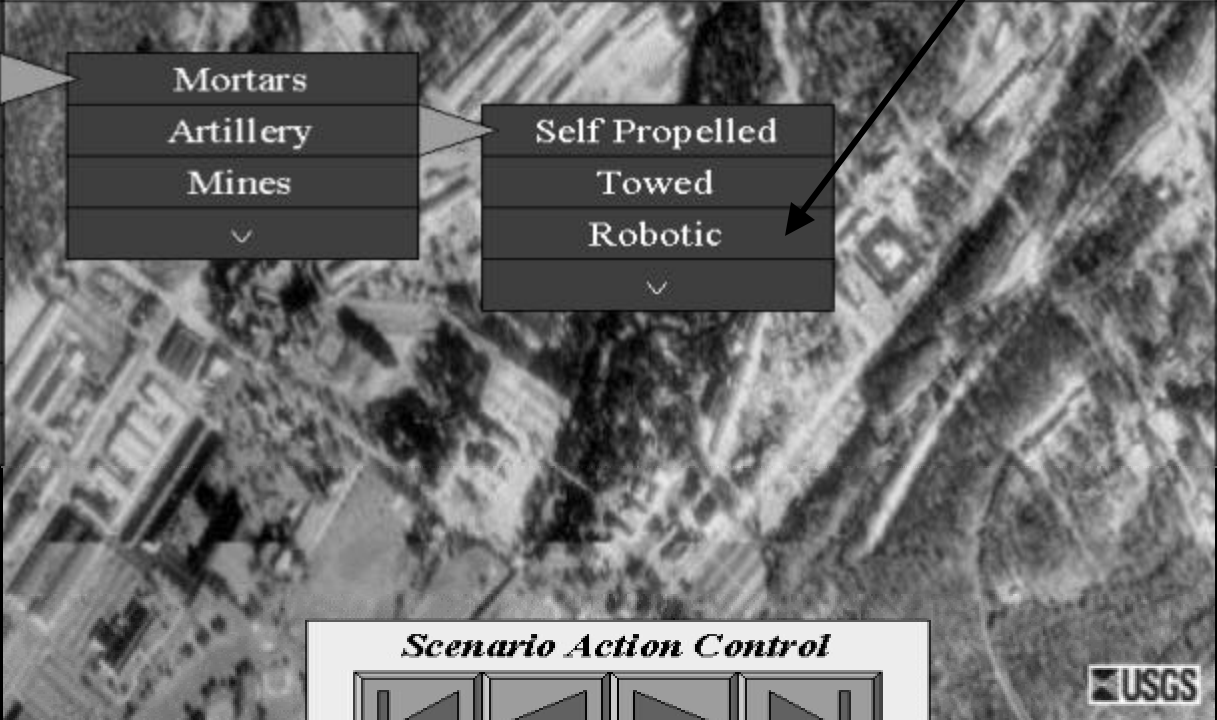
⏮

⏪

⏩

⏭

Activate Whiteboard Stylus





## *We all have some work to do...*

☐ Early development of models

☐ Model reuse from top to bottom

☐ Model reuse from start to finish

☐ Development of standards

☐ Adherence to standards

☐ Wiring together existing resources

–models

–simulators

–trainers

–labs



☐ Working horizontally across:

–PEO/PM's

–BattleLabs

–RDECs

–Contractors





## *The bottom line...*

- The Army needs a tool for evaluating FCS
- That tool has to be calibrated against our existing capability
- The affect of the tech base on FCS must also be measured
- The tool must measure force effectiveness as a function of:
  - Component changes
  - Subsystem changes
  - Platform changes
  - Network changes
  - Tactical changes
  - Logistics changes
- That tool can be the RDEC Federation...